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THE PHYSICAL AND CHEMICAL PROPERTIES OF LITHIUM BENZOATE AND LITHIUM SALICYLATE.

By Lyman F. Kebler.
Research Committee E, Pharmacopœia Revision.

LITHIUM BENZOATE.

Very little information exists in literature concerning the above chemical, and such as does exist is generally of a pharmaceutical or medicinal character. The U.S.P. contains the best information extant, and is the only pharmacopœia, so far as I know, by which lithium benzoate is recognized.

J. J. Berzelius[1] and C. G. Gmelin were the first to make lithium benzoate. E. B. Shuttleworth[2] found it soluble in 3·5 parts of water at 60° F., and 2·5 parts at 212° F. Soluble in 10 parts of cold alcohol, sp. gr. 0·838.

As is to be expected, lithium benzoate will contain the associated impurities of both the lithium carbonate and the benzoic acid which enter into its formation. These impurities will influence its physical properties more or less. The purity of lithium carbonate was commented on in a previous paper[3], to which the reader is referred.

Benzoic acid is derived from several sources, viz., benzoin, toluol and the urine of herbivorous animals. That prepared from benzoin is expensive and is used for special purposes only. I have met with

[1] *Gmelin's Hand-Book of Chemistry*, translated by H. Watts, **12**, 39.
[2] 1875, *Canadian Pharm. Jour.*, 229; Am. Jour. Pharm., **47**, 113.
[3] 1898, Am. Jour. Pharm., **70**, 600.

only one sample of lithium benzoate made with this acid. The ex-toluol acid may contain chlorinated compounds, and the urine-acid is liable to be contaminated with hippuric acid and possess a urine-like odor.

The samples of lithium benzoate examined represent the best goods available in this country. The results are tabulated on the next page.

Only those pharmacopœial requirements will be enumerated here on which it is necessary or seems desirable to make comment, as the result of this investigation.

"Soluble at 15° C. in 4 parts of water, and in 12 parts of alcohol; in 2·5 parts of boiling water and in 10 parts of boiling alcohol. Sodium benzoate increases its solubility in water and diminishes that in alcohol." By comparing the above statements with the results on solubility in the preceding table, it would seem that the samples of lithium benzoate were contaminated with the corresponding sodium salt. An examination, however, showed that such was not the case. This was farther supplemented by making a sample of lithium benzoate from lithium carbonate and benzoic acid of known purity. No. 1 is the sample so prepared.

There certainly are marked differences between the solubilities as given by the U.S.P. and those actually obtained in this investigation.

The solubilities at 15° C. were determined by the digestion method. The solvent was allowed to act for several days, with frequent agitation, on an excess of the chemical at a temperature slightly below 15° C. When the solvent did not appear to take up any more of the salt, the temperature was kept at 15° C. for about four hours, shaken as above, then filtered and the amount of solvent determined in a given weight of the filtrate.

The solubilities in "boiling water" and "boiling alcohol" were determined by estimating the amount of the salt actually dissolved at the boiling point of the saturated solution. This, of course, is much higher than 100° C. for water, or about 78° C. for alcohol. The writer has seen the boiling point of such an aqueous mixture rise up to 140° C. and above, and an alcoholic solution as high as 95° C.

On ignition, a residue of lithium carbonate mixed with carbon is left. It would be more nearly correct to say that the mixture consists of lithium carbonate, carbon and the oxides of lithium.

No.	Physical Appearance.	Microscopical Appearance.	Odor.	Per cent. of Lithium Benzoate, Gravim.	Per cent. of Lithium Benzoate, Volum.	Color of 10 per cent. Solution.	Per cent. of Moisture.	Reaction on Litmus.	Reaction on Phenolphtalein.	Reaction on Cochineal.	Solubilities. One Part of Salt Required; Parts.			
											Water at 15° C.	Boiling Water.	Alcohol, 95 p. c. at 15° C.	Boiling Alcohol, 95 p. c.
1	White powder	Amorphous	Benzoin-like	99·89	98·46	Slight tint	1·75	Neutral	Neutral	Alkaline	2·46	1·9	19·1	16
2	White powder	Some crystals mostly Amorphous	Benzoin-like	99·00	99·00	Slight tint	0·60	Neutral	Neutral	Alkaline	2·56	2	18·9	17
3	White scales	Apparently broken crystals	Balsamic empyreumatic	100·20	97·92	Colorless	8·50[1]	Neutral	Alkaline	Alkaline	2·56	2	19	16·5
4	White scales	Apparently broken crystals and amorphous	Odorless	99·92	98·00	Colorless	0·90	Neutral	Neutral	Alkaline	2·56	2	19·3	16·5
5	White scales	Apparently broken crystals and amorphous	Odorless	99·81	—	Slight tint	1·00	Neutral	Neutral	Alkaline	2·40	2	19	16·3
6	White powder	Amorphous	Benzoin-like	99·80	97·23	Colorless	1·23	Neutral	Neutral	Alkaline	2·46	2	19	16·4

[1] The high percentage of moisture in No. 3 is noteworthy. One-half molecule of water of crystallization corresponds to 6·58 per cent.

I was always of the opinion that lithium benzoate was acid to litmus. Such, however, is not the case. The excess of benzoic acid is probably volatilized with the aqueous vapor, formed during the process of manufacture.

In the Digest of criticisms on the U.S.P., 1890, Part II, p. 102, we find the following: "The addition of a drop of ammonia to the ferric chloride T. S. (fifth paragraph), is necessitated by the *slight acid reaction of the lithium*[1] *salt.*" Berzelius prepared the basic ferric benzoate as directed by the U.S.P. The reason for adding the ammonia is not apparent. It cannot be to neutralize the acidity of the ferric chloride solution, for, when the basic iron benzoate is formed, hydrochloric acid is liberated, which, in turn, liberates benzoic acid.

The voluminous precipitate formed when a ferric chloride solution is added to an aqueous solution of lithium benzoate or any other neutral soluble benzoate, is but flesh-colored or light brown, rather than brownish-pink.

Under this chemical two sets of tests are given for chlorides and sulphates. One set allows a limit of both impurities, the other set excludes them rigidly. The first set does not add quite enough nitric acid to remove all the benzoic acid, which interferes with the chloride test. In the second set the tests are to be applied to a 5 per cent. aqueous solution, without previous removal of the benzoic acid. The addition of silver nitrate to this solution causes a precipitate of silver benzoate. Barium benzoate is sufficiently soluble, so that the above concentration could be employed in testing for sulphate, but another procedure would be safer.

On adding a slight excess of hydrochloric acid to a 5 per cent. aqueous solution of the salt, a voluminous white precipitate of benzoic acid is formed, which, after being separated by filtration and thoroughly washed and dried, should respond to the tests given under benzoic acid. If to a small portion of the filtrate, a few drops of barium chloride solution are added, not more than a very slight turbidity should result (limit of *sulphate*).

On evaporating the remaining filtrate to *dryness*, 1 part of the residue should be soluble in 5 parts of absolute alcohol, and the addition of an equal volume of ether should not produce a turbidity (limit of *other alkalies*). A 2 per cent. aqueous solution of the

[1] Italics, L. F. K.

above residue should not be affected by the addition of a little sodium cobaltic nitrite solution (limit of *potassium*).

All the other tests, excepting that for chloride, could be applied to this solution, or an aqueous solution of the salt itself could be employed. This solution (1–25) should not be affected by hydrogen sulphide or ammonium oxalate, and should not produce more than a slight coloration with ammonium sulphide.

If 0·5 gramme of the salt is dissolved in 25 c.c. of a mixture, consisting of 10 parts of water and 15 parts of alcohol, then acidulated with nitric acid, the resulting solution should not produce more than a slight opalescence on the addition of a few drops of silver nitrate solution (limit of *chloride*).

The method of ignition and subsequent titration for estimating the per cent. of pure salt, as per the U.S.P., has not given me satisfactory results. The results were non-concordant, and the time required for bringing about complete solution of the ignited residue was all out of proportion to that allotted the ordinary analyst. I have allowed the solvent to act for forty-eight hours, with frequent agitation, and yet, in some cases, solution was incomplete. The ignited residue becomes so hard and adheres so firmly to the porcelain vessel, that it almost appears to form part of the vessel. I tried ignition at higher and lower temperatures, hoping thus to overcome the above difficulty, but without success.

After spending some time and sacrificing a number of porcelain dishes, I happily thought of a method that proved to be very satisfactory. It is as follows: Weigh about 0·5 gramme of the dry lithium benzoate into a platinum capsule, add 2 grammes of pure, *dry*, ammonium sulphate, mix well with a platinum wire and ignite. Apply the flame gradually at first, so as to avoid any possible spurting. The residue is lithium sulphate. From this the amount of pure lithium benzoate can easily be calculated.

One gramme of pure, dry lithium benzoate yields 0·43 of a gramme of lithium sulphate, or the amount of lithium sulphate multiplied by 2·3256 gives the amount of pure lithium benzoate in the sample under examination.

The above method can be readily and quickly applied, and the results are concordant. An estimation can easily be made in twenty minutes. I have made them in ten minutes. As soon as the ammonium sulphate begins to decompose the benzoic acid is liber-

ated from the lithium and appears to volatilize immediately, since only a small portion is carbonized. That the sulphuric acid facilitates the combustion is well known.

If the ammonium sulphate should contain any non-volatile matter, this can be estimated and an allowance made in the calculation. This chemical can easily be prepared pure, from pure ammonium carbonate and pure sulphuric acid. The salt must be thoroughly dried, so as to eliminate all water.

The U.S.P. requires that the dry salt shall be 99·6 per cent. pure. The average of my six determinations is 99·77 per cent. According to these results, the U.S.P. requirement is not too exacting.

LITHIUM SALICYLATE.

Much that has been said of lithium benzoate applies also to lithium salicylate. It must be remembered, however, to keep in mind salicylic instead of benzoic acid. Lithium salicylate is recognized by several pharmacopœias besides the U.S.P., viz.: the Arzneibuch, 1895; Pharmacopœa Helvetica, 1893, and Pharmacopœa Norvegica, 1895.

M. Julliard,[1] a French pharmacist, examined a number of samples of lithium salicylate, and found that those samples which produced permanent colorless solutions were either acid in reaction or contained from 15 to 20 per cent. of sodium salicylate. The samples examined by me were all acid in reaction, but none contained any sodium salt beyond that introduced by the lithium carbonate used in their manufacture. The results of this investigation are embodied in the accompanying table:

[1] 1887, *Bull. Com. June;* Abstr. in AM. JOUR. PHARM., 59, 400.

No.	Physical Appearance.	Microscopical Appearance.	Reaction on Litmus.	Concentrated H_2SO_4 Test.	Moisture at 110° C.
1	White powder.	Semi-crystalline.	Acid.	Slight color.	4·40
2	" "	"	"	" "	4·32
3	Grayish "	"	"	" "	4·50
4	Ashen "	Amorphous.	"	Dark "	3·95
5	Grayish "	"	"	Slight "	4·00

No.	Per Cent. of Lithium Salicylate.	Soluble in Parts.			
		Water at 15° C.	Boiling Water.	Alcohol, 95 Per Cent. at 15° C.	Boiling Alcohol, 95 Per Cent.
1	99·56	0·72	0·45	1·63	0·91
2	98·81	0·75	0·46	1·63	0·91
3	100·31	0·84	0·46	1·81	0·92
4	99·09	0·79	0·49	1·70	0·93
5	98·60	0·74	0·44	1·70	0·91

This chemical is deliquescent only in a moist atmosphere.

For products formed by igniting lithium salicylate, see same operation under lithium benzoate.

No. 4 gave a precipitate with copper sulphate solution. This sample will not be considered any farther, for it undoubtedly is an abnormal product. It, however, comes from a good manufacturer.

The method given by the U.S.P. for detecting chlorides is not safe. Lithium chloride decomposes into lithium oxide and hydrochloric acid, when ignited under certain conditions. The fixed alkalies volatilize at high temperatures. Therefore, the test is not safe. Chlorides can be tested for by the procedure outlined above (sulphates cannot, with safety, be tested for in this mixture) under lithium benzoate, for detecting chlorides. The remaining impurities can also be tested for by the directions given there.

The Pharmacopœia requires this chemical to contain 99·13 per cent. of pure lithium salicylate. According to the above results, this is not excessive, and might well be retained. The method of

estimating the purity is the same as that given under lithium benzoate.

One gramme of pure, dry lithium salicylate yields 0·38224 of a gramme of lithium sulphate or the weight of lithium sulphate multiplied by 2·61615 gives the equivalent of lithium salicylate, which, multiplied by 100 and divided by the weight taken, equals the per cent. of pure lithium salicylate.

The ammonium sulphate method for estimating the purity of lithium benzoate or lithium salicylate will be vitiated in proportion to the non-volatile matter present. The limit tests for impurities will, however, reduce this defect to an inappreciable amount.

35 Poplar Street, Philadelphia, Pa.

PHARMACOPŒIAL PREPARATIONS FROM AN ECONOMICAL STANDPOINT.

By Charles H. La Wall.

The apothecary, druggist, pharmacist, pharmaceutical chemist, or, whatever you may choose to call the man who keeps "the store with the colored show-globes in the windows," is an individual who makes enormous profits by charging extortionate prices for everything he sells, according to the universal opinion of the laity.

Just when and where this idea originated is involved in obscurity, but, nevertheless, it is accepted as a fact by persons in almost every other line of business.

The agriculturist, who has a horse or cow sick, will unhesitatingly pay a veterinary doctor $5 or $10 for his services, but will complain if the druggist charges him 50 cents for the medicine which renders the cure possible.

The pharmacist's education requires just as much time and expense as that of the veterinary, but this fact is ignored, probably because he furnishes something tangible, which the purchaser believes he could get more cheaply, if he could know just what he requires. That is the point which is overlooked, *i. e.*, that the pharmacist has expended his time and money to learn how to compound these various medicaments and all about their properties.

Now, since the educational course in pharmacy is longer in duration and greater in expense entailed; and now that laws are being enacted which require all preparations to conform to certain stand-

ards; we find no corresponding increase in either profits or sales, to restore the equilibrium thus disturbed.

Associations are being formed, of members of the different branches of the drug trade, in order to counteract these acknowledged evils, but no satisfactory way has yet been discovered by which prices may be increased, meanwhile the growing number of pharmacists cuts down the volume of business to a point where many a druggist makes little if any more than his head clerk.

A recent graduate in pharmacy, who had high ideals when he graduated and started in business for himself a few years ago, lately gave the writer some new ideas regarding "pharmaceutical economics."

Some of these views are worthy of consideration, and will be appreciated by many pharmacists whose ideals have suffered by coming into contact with practical realities.

"If a pharmacist makes 1,000 c.c. of any one of the opium preparations of the U.S.P.; and takes 100 c.c. (or 10 per cent.) for assaying the same, in order to make the preparation comply with the standard requirements; how can he sell it in competition with the druggist on the next corner, who makes the same preparation from the 'gum' opium instead of the powder (using the same weight also), and who does not standardize the end product at all?

"The same holds true with regard to preparations of nux vomica.

"If a conscientious pharmacist tests all of the goods which he purchases, how is it possible for him to make up for the loss of material used in testing each substance? This loss is, of course, a fixed quantity, whether the substance is purchased by the ounce or by the pound, thus making the heaviest loss fall upon the purchaser of the smallest quantities, *i. e.*, the pharmacist who has just started in business and is endeavoring to keep down expenses at first.

"That this is no light matter to the pharmacist, whose capital is limited, will be appreciated by glancing over the following list of substances with the approximate amounts used in complying with the U.S.P. tests. This does not include loss of substance in taking Sp. Gr. or B. Pt.:

Æther	40 c.c.
" Acetic	25 c.c.
Alcohol	80 c.c.
" Absolutum	80 c.c.
" Deodoratum	80 c.c.

Aqua Hydrogenii Dioxidi	170 c.c.
Amyl Nitris	10 c.c.
Chloroform	75 c.c.
Extractum Opii	4 grammes.
Opium	10 grammes.
Opii Pulvis	10 grammes
Spiritus Frumenti	200 c.c.
" Glonoini	20 c.c.
" Vini Gallici	200 c.c.
Syrupus Acidi Hydriodici	32 grammes.
Vinum Album	80 c.c.
" Rubrum	150 c.c.

"The rare alkaloids as hydrastine hydrochlorate, hyoscine hydrobromate, hyoscyamine hydrobromate, and sulphate; physostigmine salicylate, and sulphate, and pilocarpine; also elaterin, gold and sodium chloride, musk, many volatile oils, etc., require certain tests, such as melting point, solubility, boiling point, specific gravity, residue on ignition, and other tests not specifying a definite amount of substance, but, even with strict economy of material the loss in most cases is more than the retail druggist can afford. The retailer buys from a reliable manufacturer who standardizes his galenical preparations and guarantees his goods to conform to the U.S.P. requirements. The expense of analysis to the manufacturer is insignificant in cost of material used, as the following comparison makes clear:

"*A.* The retailer makes 2,000 c.c. tincture opium and takes 100 c.c. for assay (equivalent to 5 per cent.).

"*B.* The manufacturer makes 100 gallons (360,000 c.c.) of the same preparation and takes 200 c.c. for assay (having the advantage of duplicates for correction of possible errors) which is equivalent to about one-twentieth of 1 per cent. The difference is apparent."

Another suggestion from the same source was not so important, but is given here for what it is worth. "Why are the U.S P. ointments the only class of preparations where the quantity directed to be prepared is varied according to the costliness or use of the preparation? The same might be done for consistency's sake with some of the other U.S.P. preparations. For example: 1,000 c.c., the quantity directed for tincture musk, would cost about $30, and would be sufficient to last for many years in most stores. Trituration of elaterin, 100 grammes, would cost about 10, and would last forever."

These facts, while not new in themselves, indicate a new way of looking at an old subject, and may bring out points which have hitherto been ignored in considering commercial questions relating to pharmacy.

Increased requirements for pharmacists should be accompanied by increased remuneration for services rendered, and no true progress can be made until equilibrium is established in this direction.

POPLAR AND CANAL STREETS, PHILADELPHIA.

SOME OBSERVATIONS ON FLUID ACETRACTS IN COMPARISON WITH FLUID EXTRACTS.

BY WM. B. THOMPSON.

Where radical change in the method of preparing medicines is advocated or proposed, we cannot be expected to accept any statement of facts, however responsible or authoritative, without some reservation. The theory may be indisputable and the deductions upon which that theory is based incontrovertible, at least in our present state of knowledge, yet when determinate or conclusive evidence is not before us we must insist upon practical demonstration rather than theory. The only crucial test of the therapeutic action of medicines is to be sought in a close clinical observation at the bedside of the patient, the physician present noting with care not only the constitutional effect, but the intermediate effects which precede the final and full impression of the medicine. To what a voluminous extent our medical literature teems with the most positive assertions of authors lauding and vaunting the virtues of some new remedy, when careful inquiry often discloses the fact that for the greater part these recorded observations have been of the most casual character, and the result more frequently attributable to other and auxiliary means rather than to that of the chief instrumentality. So that we had better err on the side of over-caution than to rely upon so serious a venture as experimental medicine at the moment of emergency.

There has been submitted to the trade judgment a class of fluid pharmaceutical preparations to which the term "Acetracts" has been very aptly applied, all these being of an acetous character. The samples which have come under the writer's observation have been subjected only to the test of a casual observation, with such

conclusions as would naturally form in the mind of any pharmacist who has become reasonably familiar with the practice of instituting comparisons—more of a familiar, we may say, than of a technical examination.

The first impression is that there is presented in these fluid "acetracts" a method of procedure and result which completely revolutionizes all former conclusions and absolutely deranges all previous theories as to what constitutes the best general solvent for all those varied, complex constituents of drugs and other medicinal substances; for we are restricted, in preparing "acetracts," to what is practically an aqueous menstruum. If the original menstruum of our infusions, reinforced with but a small percentage addition of a vegetable acid, will prove a better or an equally good solvent for the alkaloidal and other active constituents of miscellaneous drugs, then all our previous teaching has been at naught, and alcohol, that universal agent of extraction and solution, must be relegated, as far as future uses are concerned, to the anatomical jars of the pathological museum or to a curtailed use in the arts.

Experience and practice extending over an unlimited period of observation in pharmacy has apparently fixed and confirmed the value of alcohol, in varying proportions with aqueous media, as being the true and only known natural solvent for all the useful vegetable matter with which the active medicinal principles are allied in drugs. We are without any intelligent explanation from scientists as to the character of the peculiar property of alcohol and its congeners, the ethers, as a solvent. We must, in our ignorance, conclude that its penetrative and searching quality is *sui generis*. How can we, then, regard any substitution for this distinguishing quality by a purely aqueous menstruum, although slightly acidified, as other than a retrograde step and a partial return to primitive infusions, only saved from an inevitable decomposition by the intervention of an antiseptic vinegar? We are left in doubt as to the precise part, other than that, that the acetic acid can possibly exert in the small percentage additions which are made of it to the exhausting menstrua. Surely it cannot be contended that a 10 per cent. addition of acetic acid to water would be likely to materially increase the solvent power of water. One marked feature in some of the "acetracts" is the absence of a certain gravity and density which is always observable in official and standard

fluid extracts of the proper quality. There is also a very striking difference in the color of the fluids, and the acetracts are not altogether free from the grumous or beclouded appearance. In some specimens of the "acetracts," where the density is more pronounced, the physical characters of the respective drugs of which they are made are not in evidence, for the acetous odor prevails uniformly, of course, and a usual means of identity is thus lost. Now, in regard to what we mean when we use the term strength as applied to acetracts. It is conceivable that, by the method of repercolation and reservation, a series of first percolates added together would form dense solutions.

But even this physical state would not be a valid argument in the absence of alkaloidal assay, and other test examination, that the full required medical strength resided in a given sample. But we must return to our original proposition as to tests for confirmatory proof that this substituted menstruum will afford as good results as the action of grain spirit.

There has also been advanced, the somewhat ingenious idea that the acid pickles and preserves the alkaloids of active drugs. This may be true, and may be important also as a hint in future procedure. If the acid has a congenial affinity for the basic substance, and can seduce it from its close association and embrace, the active principle might be put in more permanent form in all this class of fluid preparations—not only the adoption of the acetracts into use is attended with some difficulty, but there is a certain familiarity which has become established in regard to the present class of fluid extracts which only a persistent argument and presentation of established fact could remove. This whole subject merits attention and should receive it at the hands of progressive pharmacists—the somewhat more homely garb in which these acetracts are introduced to us should not preclude our forming a close acquaintance with them and if found worthy, adopt them into our permanent friendship.

For the purpose of more forcibly illustrating what we have here said, we may be permitted to state briefly a few observations which were made between the acetracts and fluid extracts.

Cotton Root Bark.—Acetract—A fluid of brown color; thin, light, mobile. Percentage of acetic acid not known. Standard Fluid Ext. Cotton Root Bark made with 75 per cent. alcoholic menstruum is a rich colored red, dense fluid; clear, and of much heavier specific

gravity. This drug has for its chief constituents an acrid resin soluble in 14 parts of alcohol.

Extract Coca.—Acetract—Of brownish, or rather inkish character and grumous state. Its density is due to the large preponderance of aqueous menstruum. A close comparison of sensible properties is prevented by the vinegar which masks the taste. The Standard Fluid Ext. of Coca Leaves is made with 75 per cent. alcoholic menstruum; rich in chlorophyll and natural coloring. The composition is given as residing in a bitter principle, resin, tannin, an aromatic principle, chlorophyll and the alkaloid.

Cascara.—Acetract—Presents a good appearance, shows considerable amount of coloring matter, quite pronounced in taste, although between the natural bitterness and the acetic menstruum it is difficult to recognize. Cascara is readily exhausted with water and might furnish a good type of admissible acetracts. The Standard Fluid Extract has a more highly charged body of vegetable extractive and is quite different in appearance, being more like the Fluid Rhubarb in color and density.

Buchu.—Between these fluids there is a most striking difference. The acetract being a light colored brownish liquid with a much mingled odor; cloudy but without apparent precipitate. Standard Fluid Ext. Buchu is very rich in green coloring matter; clear, bright and most pronounced in characteristic odor; a markedly different liquor in every way. The menstruum of the latter is 95 per cent. alcoholic, the constituents of Buchu, an oil and (stereoptene) camphor.

Digitalis.—The acetic character of this "acetract" would preclude its use in the present official infusion much prescribed. The odor of the acetract is peculiar and does not suggest the drug as does the official preparation. The color is dull brown and black, and not the bright transparency of the official.

Gentian Comp.—This is a type of "acetract" which might be acceptable save for the acetification which can only perform a secondary part in its preparation. The general appetite does not incline to acidity in taste.

Ergot.—This is a type of the class which might appropriately be made as an "acetract" as the drug yields all its virtue readily to water, and the acid addition is of recognized use in permanently fixing the volatile active principle of the drug, but the acetract could not be used hypodermically.

Aconite Root.—The most observable feature in this "acetract" is the exceptionally dark color, the official being of a light wine color and of high alcoholic percentage; no odor of the drug perceptible; only a faint tingling sensation follows its touch upon the tongue. Not so with the official, where this numbness continues for hours.

Belladonna Root.—The "acetract" diluted with water makes a comparatively clear solution, whilst the official fluid when so diluted yields a most copious precipitate. No odor of drug or other contained sensible property exists.

ANALYSIS OF COMMERCIAL VINEGAR.

By Frank G. Ryan, Ph.G.

This investigation does not present anything new to the commercial analyst; it was however thought of sufficient importance to bring to the attention of this meeting, with a view of illustrating a class of analytical work that may be undertaken by graduates in pharmacy, which would prove both profitable and legitimate employment.

The analyst is called upon frequently, at the present time, for work of this kind, and with the more rigid enforcement of the "pure food and drug laws" by the various States, a new field of employment is undoubtedly being created for the intelligent pharmacist.

In the *Journal of the American Chemical Society*, Vol. XX, 3, Albert W. Smith gives the results of a large number of examinations of cider and spirit vinegar, and other important information connected with the subject, and from which many of the facts here presented have been taken.

Most State laws upon the subject require that cider vinegar shall contain not less than 4 per cent. of absolute acetic acid, and at least 2 per cent. of apple solids, the latter determined by evaporation over boiling water. The substitution, wholly or in part, of spirit vinegar makes an analysis necessary to determine the source of the product, and an examination of the ash has been found to give the best results.

The burning of the solids from cider vinegar is accomplished with considerable difficulty on account of the low temperature at which the mass fuses, enclosing particles of unconsumed carbon.

In spirit vinegar there is no difficulty in reducing the mass to ash. Spirit vinegar yields much less ash than cider vinegar, and the latter differs from the former in containing only traces of sulphates and chlorides, and considerable quantities of alkaline carbonates and phosphates, the phosphates being present in the proportion of two parts of soluble to one part of insoluble phosphates. In samples to which water, containing calcium and magnesium, has been added the amount of soluble phosphates is much reduced, and insoluble phosphates increased. A solution of the soluble ash will show a potassium flame unobscured by sodium light, while samples containing added water will usually show a sodium flame.

In the analysis of vinegar the total solids are determined by evaporating 10 grammes to a constant weight on a water bath. Total acidity is estimated volumetrically with standard alkali, using phenolphtalein as an indicator, 5 grammes of vinegar being first diluted to 50 c.c. with distilled water.

To estimate the ash, 10 grammes are evaporated and burned at a low temperature, the product weighed and the soluble portion removed by washing with water, this solution being tested for sulphates and chlorides, as well as for the color of flame.

For alkalinity of ash, 25 grammes are evaporated and burned, the soluble carbonates and phosphates removed by repeated washing with hot water, and the solution titrated with deci-normal oxalic acid, using methyl-orange as an indicator, and the result expressed in the number of cubic centimetres of acid required for 100 grammes of vinegar. The soluble and insoluble phosphates in the ash from 25 grammes of vinegar being separated, the amount of P_2O_5 in each is determined, Pemberton's method being employed by the writer.

In the following table the result of the examination of three commercial samples is given:

	Specific Gravity 15° C.	Acetic Acid.	Total Solids.	Ash.	No. c.c. Decinormal Acid Required to Neutralize Ash from 100 Grammes of Vinegar.	Milligrammes P_2O_5 in Water Soluble Ash from 100 Grammes Vinegar.	Milligrammes P_2O_5 in Ash not Soluble in Water from 100 Grammes Vinegar.	Total P_2O_5 in Ash from 100 Grammes Vinegar.	Caramel.
Average[1] pure cider vinegar, 22 samples . .	—	4·46	2·83	0·39	38·8	19·1	10·1	28·6	—
A	1·0146	4·06	1·95	0·26	30	8	12	20	absent
B	1·015	3·97	2·3	0·087	16	3	10	13	present
C	1·016	3·98	2·4	0·032	8	trace	5	5+	present

[1] Albert K. Smith.

A is undoubtedly cider vinegar, containing added water, as is shown by the small amount of soluble phosphates present.

B is a mixture of cider and spirit vinegar, the amount of ash and soluble and insoluble phosphates being very low, the alkalinity of the ash also being deficient.

C is spirit vinegar with a little cider vinegar added, probably to give it flavor.

THE ASSAY OF EXTRACTUM IPECACUANHÆ LIQUIDUM.[1]

By Harold Wilson.

The British Pharmacopœia contains a liquid extract of ipecacuanha, which is standardized to contain not less than 2 and not more than 2·25 grammes of alkaloid in 100 c.c., and an assay process is made official, of which the following is an outline:

Twenty c.c. of the strong liquid extract are diluted with an equal volume of water and the alcohol removed by heating on a water bath; excess of solution of subacetate of lead is then added, and the liquid filtered off, the precipitate being washed with water and the washings added to the filtrate. This liquid is then freed from lead by precipitation with dilute sulphuric acid and subsequent filtration, the precipitate being washed with water, and the washings added to the filtrate. It is now transferred to a separator,

[1] *Pharmaceutical Journal*, July 2, 1898, p. 3.

excess of solution of ammonia is added, and the alkaloids are removed by shaking with three successive quantities of 25 c.c. chloroform. The mixed chloroformic solutions are evaporated in a tared dish, the residue dried below 80° C., and weighed as total alkaloids.

On trying the above process on a sample of the liquid extract I was struck by its complexity and by the length of time required for its completion. Twenty c.c. of liquid extract required about 7 c.c. of the official solution of subacetate of lead for complete precipitation, and a magma-like mass resulted, which filtered very slowly (taking three to five hours), and which, even after having been washed as thoroughly and carefully as possible, still contained a considerable quantity of alkaloid, as experiments proved.

Two separate assays of 20 c.c. of the liquid extract were made by the official process, 50 c.c. of water being used to wash the precipitate obtained on adding the excess of lead subacetate solution.

No. 1 assay yielded ·386 alkaloidal residue.
No. 2 assay yielded .393 alkaloidal residue.

The washed lead precipitates were then examined for alkaloid, as follows:

The precipitate was washed from the filter with water, decomposed with excess of dilute sulphuric acid, and the liquid filtered from the sulphate of lead into a separator. Ten c.c. of ether-chloroform were then added and the mixture agitated; the ether-chloroform was allowed to separate and was then run off and rejected. This treatment was twice repeated. Excess of solution of ammonia was then added, and the precipitated alkaloids removed by agitation with successive quantities of ether-chloroform. The mixed ether-chloroform solutions were evaporated and the residue dried below 80° C. and weighed.

Precipitate from No. 1 assay yielded ·031 gramme alkaloidal residue.
Precipitate from No. 2 assay yielded ·028 gramme alkaloidal residue.

Not only, therefore, is the official process from the nature of the lead precipitate tedious to perform, but it is inaccurate, since it involves loss of alkaloid.

A number of experiments were then made with the object of devising a simpler, quicker and more accurate method of assay, as a result of which I suggest the following as possessing these advantages:

"Take 20 c.c. of the strong liquid extract, dilute with 20 c.c.

water, place in a porcelain dish and dissipate the alcohol by evaporating the mixture to rather less than half its bulk; allow to cool. Now add 1 c.c. dilute sulphuric acid and transfer to a separator, washing the dish with 20 c.c. water and adding these washings to the liquid in the separator. Add 10 c.c. ether-chloroform (ether and chloroform equal volumes), agitate, warm to promote separation; run off and reject the ether-chloroform layer and twice repeat the treatment with the same quantity of ether-chloroform. Add now 10 c.c. ether-chloroform and excess of solution of ammonia, agitate, warm and run off the separated ether-chloroform layer into a tared dish; agitate with two more similar quantities of ether-chloroform, separate as before, adding these solutions to that in the tared dish. Evaporate the mixed solutions and dry the residue below 80° C. until of constant weight. This weight, less that of the dish, will give the weight of total alkaloids present in the quantity of liquid extract operated on."

It was determined to compare the values of the official and suggested processes by assaying the same sample by both methods, and to ascertain the weight of alkaloid yielded as well as the amount of decinormal acid such weighed residue was capable of neutralizing, thus obtaining a check on the relative amounts of alkaloid present.

Two assays of the same quantity of extract were, therefore, made by the process suggested:

No. 1 assay yielded ·417 gramme alkaloidal residue.
No. 2 assay yielded ·426 gramme alkaloidal residue.

The foregoing gravimetric results may be summarized thus:

	Alkaloid Extracted.	Lost in Lead Precipitate.	Total.
Official Process—			
No. 1	·386	·031	·417
No. 2	·393	·028	·421
Mean	·389	·029	·419
Suggested Process—			
No. 1	·417	—	·417
No. 2	·426	—	·426
Mean	·421	—	·421

From the above figures it will be seen that when the alkaloid is recovered from the lead precipitate, practically the same quantity of alkaloid by weight is obtained by each process.

The relative alkaloidal value of these residues was then deter-

mined by titration. Owing to the fact that when chloroformic solutions of the alkaloids of ipecacuanha are evaporated the solution rapidly darkens and a colored residue is obtained, it was found necessary to carry out this operation in a very dilute solution, and in order to obtain strictly comparative results exactly the same conditions were observed in every case. Each residue was dissolved in 10 grammes of rectified spirit and diluted with 600 grammes distilled water. Excess of N-10 H_2SO_4 solution was then added, and the mixture titrated back with N-100 NaOH solution, using tincture of cochineal as indicator. The number of cubic centimetres of soda solution required was divided by ten and subtracted from the number of cubic centimetres of acid added, giving the following figures:

Official Method—

No. 1 . . . . . ·386 equal 13·97 c.c. N-10 acid.
No. 2 . . . . . ·393 equal 14·18 c.c. N-10 acid.

Suggested Method—

No. 1 . . . . . ·417 equal 14·88 c.c. N-10 acid.
No. 2 . . . . . ·426 equal 15·24 c.c. N-10 acid.

The residues recovered from the lead precipitate were also titrated.

No. 1 . . . . . ·031 equal 1·02 c.c. N-10 acid.
No. 2 . . . . . ·028 equal 1 c.c. N-10 acid.

From these figures the following calculations can be made, showing that within the limits of experimental error the residue yielded by the suggested process is as rich in alkaloid as that of the official one:

By Official Method from—

No. 1 assay 1 gr. alkaloidal residue equal . . . . 36·2 c.c. N-10 acid.
No. 2 assay 1 gr. alkaloidal residue equal . . . . 36 c.c. N-10 acid.

By Suggested Method from—

No. 1 assay 1 gr. alkaloidal residue equal . . . . 35·7 c.c. N-10 acid.
No. 2 assay 1 gr. alkaloidal residue equal . . . . 35·8 c.c. N-10 acid.

As far as can be seen at present, titration appears useless as a means of estimating the alkaloids of ipecacuanha. If we take the molecular weight of emetine (248) and cephaëline (234) as given by Paul and Cownley, and, assuming these alkaloids to be present in about equal quantity, we take the mean of their molecular weights (viz., 241), then every cubic centimetre of N-10 acid used should correspond to .0241 grammes of the mixed alkaloids. If, however,

we calculate the above titration results by this method we see that there is a difference of from 50 to 60 milligrammes between the results of volumetric and gravimetric determinations, e.g.:

Gravimetric.	Volumetric.	Difference.
·386	·337	·049
·393	·342	·051
·417	·359	·058
·426	·367	·059

This difference may be due to some impurity, but more probably to the third alkaloid which is present, and which Paul and Cownley believe to have a much higher molecular weight than either emetine or cephaëline.

By the process suggested, fatty matter, resinous bodies, etc., are removed by agitation with ether-chloroform in acid solution. If this part of the process be carefully conducted it becomes unnecessary to subject the ether-chloroform solution of alkaloids to the usual purification by acid treatment, as when treated by the latter method the ether-chloroform, after shaking with acidulated water, has been proved to yield no residue on evaporation.

The drying of the alkaloidal residue till of constant weight is tedious, but no means can at present be devised for shortening this operation, as cephaëline has been shown by Paul and Cownley to lose weight at 100° C., and hence to guard against this loss the residue must be dried below 80° C.

The advantages claimed for the suggested assay process over that official are the two very important ones of speed and accuracy. The assay can be easily completed, with the exception of drying the residue, well within the time required by the official process for washing the lead precipitate alone. A residue of greater weight is extracted which has been proved by titration to be equally rich in alkaloid. From the mean results given earlier it will be seen that by the official process ·389 gramme is extracted and ·029 gramme lost, that is to say, the loss is between $\frac{1}{14}$ and $\frac{1}{15}$ of the total alkaloid present. These figures are based on the results obtained on carefully washing the precipitate with 50 c.c. water which, considering the time taken (at least three hours), was judged a fair quantity; but if double that quantity of water be used to wash the precipitate, it has been proved to still contain a notable proportion of alkaloid.

The foregoing experiments have been carried out in the pharmacy laboratory of the Pharmaceutical Society.

CHARLES AUGUSTUS HEINITSH, PH.M., D.Sc.

By J. H. Redsecker, Ph.M.

Dr. Charles Augustus Heinitsh, one of the oldest, most widely-known and universally esteemed pharmacists in the country, died in Lancaster, Pa., on Thursday afternoon, December 29, 1898, after a brief illness of pneumonia. Mr. Heinitsh took a cold the week preceding his death, but continued to be about his store until Monday afternoon, when he called a physician who found him suffering from pneumonia. He grew rapidly worse until Thursday afternoon, when he passed away.

The family from which Dr. Heinitsh sprang was of Polish-Saxon origin, his great-grandfather, John Frederick Heinitzsch, as the name was originally spelled, being receiver of duties for the King of Saxony. His son, Carl Heinrich Heinitsh, grandfather of Charles A., came to this country in 1772, landing in Philadelphia, from whence he removed to Lancaster and engaged in business. In 1782 he founded the drug business, which is still continued. In 1803 he was succeeded by his son August, who conducted the business until 1816, when he took into partnership his brother, John Frederick Heinitsh. This continued until 1818, when the elder brother retired, and the business was conducted by John Frederick until 1841, when Charles Augustus, the subject of this sketch, became a partner. In 1849 his father retired from business, since which time, a period of almost fifty years, the business was conducted by Charles A., who, for a number of years past, has been assisted by his nephew, Sigmund W. Heinitsh, by whom the business will be continued. Dr. Heinitsh's store was widely and favorably known throughout Lancaster County, and anything bearing his label was accounted to be the best that the market afforded. It also had the great distinction of being the oldest pharmacy in America that has been continuously in the same family and name.

Dr. Heinitsh was born in Lancaster, Pa., where he resided all his life, July 31, 1822, and was, at the time of his death, in the seventy-seventh year of his age. He was educated in the private schools of Lancaster, at the Lititz Academy, under that most distinguished teacher, John Beck, and at the Pennsylvania College, Gettysburg, where he remained until his health failed him, when he was obliged to give up his studies. Returning home, he entered his father's drug store and devoted his attention to acquiring a knowledge of the

business in which, in his subsequent career, he attained pre-eminent distinction. In 1848 he made a tour of Europe with several friends for the purpose of pleasure and as a means of further enlarging his knowledge of things and men. He was not only a skillful and painstaking pharmacist, but having a scientific bent of mind, he took a deep interest in the pursuit of scientific subjects. He was one of the founders of the Linnæan Society of Lancaster, an organi-

CHARLES A. HEINITSH.

zation containing amongst its members some of the most noted scientists of their day, and, at the time of his death, was its oldest charter member. He attended the first meeting of the American Pharmaceutical Association held in Philadelphia in 1851, and in 1882 was elected its president. He also attended the last meeting held in Baltimore in August last, and was specially gratified in meeting his many friends, both old and young. He helped to organize the Pennsylvania Pharmaceutical Association in 1878, and

was its first president, and the only person to whom has ever been accorded the honor of having been twice elected to this office. He was largely instrumental in the organization of the Lancaster County Pharmaceutical Association, and was elected its first president.

While actively engaged in business, requiring much of his time, he nevertheless took a deep interest in everything pertaining to the welfare of the community and the education and elevation of the people. He was school director of his city for a number of years, was a trustee of the State Normal School at Millersville, a member of the Philadelphia College of Pharmacy and an honorary member of its alumni. In March, 1887, the Philadelphia College of Pharmacy conferred on him the honorary degree of Master of Pharmacy, and in 1889 Franklin and Marshall College gave him the degree of Doctor of Science. He enjoyed, in a high degree, the confidence and esteem of the community in which he resided. When the State Medical Society met in Lancaster last spring, he was in attendance as a delegate representing the Pennsylvania Pharmaceutical Association. He was not only accorded a hearty reception, but was specially honored by being escorted to the platform and obliged to take a seat beside the president.

Mr. Heinitsh was blessed with a peculiarly affable disposition and cheerful temperament that attracted toward him all with whom he came in contact. He was loved and admired by hosts of friends, attaching them to himself "by hooks of steel" and by whom he was lovingly called "Uncle Charley." He lived continuously in the sunshine, absorbing its rays to the fullest extent, only that he might reflect them in his life; and he was rich in acts of kindness and words and deeds of love, and the world was the better for his having lived in it. "When a man dies," it has been said, "his fellowmen ask what did he leave behind; but the angels ask, what good deeds did he send before?" Dr. Heinitsh's cordial greeting, cheering words, helpful inspiration and quiet kindly acts were like a benediction, and are the "good deeds which he sent before." In such love and esteem was he held by his fellow-pharmacists in Pennsylvania, that at their meeting at Buena Vista, last June, they presented him with a gold medal[1] commemorative of his fifty years in business, and expressive of their love and admiration. It came as a complete surprise, but was none the less appreciated.

[1] [A *fac-simile* of which was given in the January issue of this JOURNAL.—ED.]

Dr. Heinitsh was married in 1851 to Maria C. Reed, of Lancaster, by whom he is survived. Their married life was a singularly happy one. We may be pardoned for drawing aside the veil of their domestic life only to say that each was devotedly attached to, and solicitous for the welfare of the other, and were happiest when in each other's society. Mrs. Heinitsh has been in feeble health for some years, and it was thought by those who had observed her, that she would have her husband's sustaining arm to the end of her days. But God's ways are not ours, and he has seen fit to order that she shall go on alone attended only by the fragrance of the memory of her loved one. They had four children, three of whom died in infancy, while Charles Augustus, Jr., who was expected to be the hope and comfort of his parents, died some years ago at the age of 16, his death being a blow from which his parents never fully recovered. In memory of him, Dr. Heinitsh sustained a mission in India. Mr. Heinitsh was a member of Trinity Lutheran Church, an active and earnest Christian, rich in deeds of love and mercy, and will be greatly missed in the community.

> " See what a grace was seated on his brow!
> A combination, and a form, indeed,
> Where every god did seem to set his seal,
> To give the world assurance of a man."

RECENT LITERATURE RELATING TO PHARMACY.

HYDROCYANIC ACID IN MITCHELLA REPENS.

Richard Fischer (*Pharm. Rev.*, 1898, p. 98) failed to find hydrocyanic acid (which is reported to occur in partridge berry) in specimens examined by him.

REACTION FOR SANTONIN.

Ten to 20 milligrammes of santonin are heated carefully with 2 grammes of concentrated sulphuric acid. To this is added, drop by drop, 2 c.c. of a solution of cerium sulphate (1 per cent.), containing 2 per cent. of sulphuric acid. Cool and dilute with 8 c.c. of water. A reddish-violet precipitate is formed, and the liquid, when clear, divided into three portions: (a) Into one add phenic acid, in excess, the phenol layer is red, the aqueous layer colorless. (b) Into another pour ether and shake it well. The whole remaining colorless. (c) Into a third put some amylic

alcohol; this turns brown and changes to violet upon the addition of phosphorus trichloride.—*Bull. Soc. roy. Pharm. Brux*, 1898.

ASSAY OF SPIRITUS CAMPHORÆ.

Eschenburg proceeds (*Zeitsch. Allg. Oest. Apoth. Ver.*, 1898, 668) using a medicine as follows: Mix 50 grammes of the spirit of camphor with 200 grammes water, and add 45 grammes benzin (0·716). The solution has a specific gravity of 0·739 at 13°, corresponding to a 10 per cent. solution of camphor in benzine. Substituting petroleum ether the solution had a specific gravity of 0·673 at 15°, showing again an increase of 0·222.

PLANT ASHES.

A useful paper on the percentage of ash in various drugs, published by Hockauf (*Zeitschr. d. allgem. Oest. Apoth.-Vex.*, 1898, p. 49). The following are the results of some of the best-known plants:

	Total.	Insoluble.
Belladonna leaves	10·5 –15·0	·08– 2·15
Stramonium	20·3 –21·3	2·4
Senna	10·0 –11·4	·4 – 1·8
Indian hemp	13·0 –14·0	1·73
Santal wood	2·0	—
Pimenta	3·9	·03
Coriander	6·85	1·1
Cascarilla	8·00–24·6	·1 – 6·5
Male fern	1·4 – 3·0	·1 – ·5
Licorice	3·6	—
Jalap	4·1 – 6·0	·2 – 0·5
Ipecacuanha	2· – 5·3	1·3
Digitalis	7·1 –10·2	·1 – 1·9
Coca	5·0 –11·5	·3 – 2·0
Conium	8·0 –12·0	—
Saffron	5·1 – 6·1	—
Cubebs	5·9 – 8·0	·1 – 0·4
Anise	11·0 –43·	3·6 –32·8
Nux vomica	2·0 – 8·40	·5 – 2·0
Cinchona	1·8 – 6·0	·1 – 1·85
Calumba	5·4 – 8·0	·2 – 3·0
Gentian	4·0 –14·0	—
Belladonna root	·3 –13·7	—
Catechu	2·2 – 5·9	.1 – 1·6

THE CONFERVA AT NERIS-LES-BAINS.

M. P. Carles (*Bull. Soc. Pharm.*, Bordeaux, 1898, 262) describes the handsome cryptogams that grow around the basin of a warm

spring at the above-mentioned health resort. They spring from the ground, are of a brilliant green, and are sometimes 50 cm. high. Some are found floating on the surface of the water in green, viscid, round masses. On decaying they show their albuminoid nature by evolution of hydrogen sulphide and ammonia, as well as forming, on heating, cyanides and ammonium compounds.

Their ash contains iodine, fluorine and silicon—elements found in the surrounding rocks and in the spring water.

As in seaweed, the iodine percentage is much higher than it is in the water in which they float.

For this reason, the plant, which is unctuous to the touch, due to the silicon it contains, has been used as a poultice and used by friction.

The author, after stating that the plant contains 98 per cent. of water, and that desiccation without putrefaction is difficult, recommends its preservation by rapid drying in a current of warm air and powdering. H. V. ARNY.

ASSAY OF MEDICATED GAUZE.

G. Schacherl read a paper on this subject before the Third International Congress of Applied Chemistry (*Pharm. Post*, 1898, 437). *Iodoform*, he finds, is best estimated by heating the gauze in a pressure flask on a water bath, with solution of sodium alcoholate in alcohol, whereby the iodoform is decomposed and the iodine converted into sodium iodide. The contents of the bottle is poured into a beaker, the gauze washed with water and the washings mixed with the alcoholic liquid, the mixture being heated to concentrate it and to drive off the alcohol.

The cooled, concentrated liquid is mixed with diluted nitric acid (nitrous free), a definite quantity of normal silver nitrate is added and an aliquot part is titrated with decinormal potassium sulphocyanate solution, whereby through the excess of silver nitrate thus formed, the utilized quantity of that reagent can be reckoned; its factor being 0.01309 grammes iodoform for each cubic centimetre decinormal silver nitrate employed. Other methods of assay—even gravimetric estimation as silver iodide—he found unsatisfactory because of evaporation of the volatile iodoform and iodine.

Carbolic acid he assays by Koppeschaar's method, treating the gauze with water at 60° C., withdrawing an aliquot part, which is titrated with decinormal bromine solution.

Salicylic Acid Gauze is readily assayed by extracting the acid with 20–30 per cent. alcohol, concentrating solution and titrating with decinormal alkali and phenolphtalein.

In conclusion, he finds commercial gauzes are of fair strength considering the difficulty of uniform distribution of the medicating agent and the tendency to deterioration by age, due to evaporation or reduction. In view of these difficulties, leniency should be shown slight deficiencies in strength, he suggesting as permissible minimum variation, 10 per cent. of the stated standard. H. V. A.

THE CONSTITUENTS OF KOLA.

C. Schweitzer (*Pharm. Zeit.*, 1898, 380) claims that the nitrogenous compound usually known as kola-red is a mixture, consisting of nitrogen free coloring matter, a nitrogenous glucoside and a ferment.

The latter he separates from the drug by digestion in 20 per cent. alcohol, pouring the filtrate into absolute alcohol when the crude ferment is precipitated. This is collected, dissolved in water and purified by repeated precipitations in absolute alcohol. Its freedom from nitrogen was shown by fusion with sodium, and its diastatic action was shown by conversion of sugar into glucose through its agency.

The glucoside was separated from the residue left on evaporation of the alcoholic extract.

After removing the theobromine, caffeine and sugar by solution in alkaline water and precipitation on neutralization—the process being repeated several times—the final product was a brown amorphous body, which, on treatment with diluted acids, yielded glucose, caffeine and theobromine.

Both caffeine and theobromine are found in kola, and an assay of the theobromine, by addition of decinormal silver nitrate and titration of excess of this reagent with decinormal potassium sulphocyanate, showed the relative amounts of theobromine and caffeine present in the drug to be about 1 to 99; the total alkaloidal strength of the drug being about 0·6 per cent.

The intimate connection of true kola-red, caffeine and glucose to the glucoside suggests as the formula of the latter, a combination of three molecules of glucose, one of kola-red and one of caffeine.

H. V. A.

ASSAY OF IODINE IN THE IODIDES OF BISMUTH.

O. Spindler (*Suddeutsch. Apoth. Zeit.*, 1898, 604) proceeds as follows:

A definite weight of the chemical is placed in a separatory funnel, is shaken with a little water and is treated with a strong solution of ferric chloride, which precipitates the iodine and dissolves the bismuth.

The iodine is shaken out with chloroform, the separated chloroform solution repeatedly washed with water to remove traces of the chlorides of bismuth and iron that may have been carried over (care being used to avoid evaporation of iodine), after which an aqueous solution of potassium iodide is added and the liquid titrated with decinormal hyposulphite solution.

By this method he finds the commercial brick-red bismuth oxyiodide averages 24 per cent. iodine, while the theoretical iodine strength of BiOI is 35·2 per cent.

H. V. A.

TESTS FOR GUM RESINS, RESINS AND BALSAMS.

K. Dieterich presents in the *Pharm. Centralh.*, 1898, Nos. 19, 20 and 21, an extended list of tests for the leading officials of the class mentioned above. The length of articles forbids more than a brief enumeration of their most salient points, and the reader is referred to the original for details.

Ammoniac and *Galbanum.*—Green fluorescence produced, on saturating with ammonia, concentrated hydrochloric acid which has been treated with the gum resins.

Not more than 50 per cent. is insoluble in alcohol. Maximum ash, 10 per cent.

Asafetida and *Euphorbium.*—Not more than 50 per cent. is insoluble in alcohol (U.S.P. for asafetida says 40 per cent.). Maximum ash, 10 per cent.

Tolu.—1 gramme in alcoholic solution titrated with $\frac{1}{10}$ normal alcoholic potassa should require 20 to 28 c.c. of latter for neutralization (corresponding to acid number 112 to 115).

Benzoin.—No odor of bitter almond is developed on heating with permanganate solution. Not more than 1 per cent. insoluble in alcohol.

Resin.—1 gramme dissolved in 25 c.c. ½ normal alcoholic potassa

should require on titration 18·6–19·3 c.c. ½ normal sulphuric acid (corresponding to acid number 160 to 180).

Myrrh.—Not more than 70 per cent. insoluble in alcohol. Maximum ash, 10 per cent. Ethereal solution of alcoholic extract turns red and violet with bromine vapors.

Damar.—1 gramme mixed with 50 c.c. benzin, 10 c.c. ½ normal alcoholic potassa and 10 c.c. ½ normal aqueous potassa, after standing twenty-four hours, should require for neutralization 19 to 19·3 c.c. ½ normal sulphuric acid (corresponding to acid number 20 to 30).

Storax.—Not more than 2·5 per cent. insoluble in alcohol. Not less than 70 per cent. should remain on evaporation of alcoholic solution (as in U.S.P.). Not more than 30 per cent. volatile. There should be no ash.

Turpentine.—10 grammes turpentine P. G. (which is semi-fluid) should solidify on addition of 2 grammes finely-powdered slaked lime. H. V. A.

EXAMINATION OF HYDRASTIS.

Schmidt (*Ph. Zeit.*, 1898, 339) has assayed golden seal to decide relative merits of rhizome and rootlets. He found rhizome and rootlets yielded 19·25 per cent. extract and 2·69 per cent. hydrastin; the rhizome alone 22·75 per cent. and 2·75 per cent. respectively, and the rootlets alone 15·50 per cent. and 1·2 per cent. H. V. A.

THE FLOWERS OF DATURA ALBA.

This plant, closely allied to our official stramonium, is largely cultivated in Germany, by reason of its handsome flowers, which, unlike our species, are very fragrant. Hesse (*Pharm. Zeit.*, 1898, 340) states that in China and India, the habitat of the plant, it is used medicinally and for illegal purposes. He lends force to this statement by extraction of hyosceine in considerable quantities.

H. V. A.

CONSTITUENTS OF SENEGA.

A careful investigation of senega is reported by Jos. Kain (*Ph. Post*, 1898, 329, 341). He states the sugar of senega is chiefly saccharose (as shown by H. J. Schroeder, A. J. P., April, 1896), and finds, besides senegin and polygalic acid, a lævogyre glucoside, which hydrolyses to two bodies—insoluble in water and not closely examined—and a dextrogyre sugar. As the new glucoside was first

extracted by precipitation from infusion with lead acetate—a method admitting possibility of the substance being a decomposition product and not a constituent of the fresh root—he disarmed criticism by employing an elaborate method of extraction, limiting the agents to alcohol and ether and the temperature to 40° C. This method also yielded the glucoside, which, differing from the other constituents of senega, is soluble in absolute alcohol and ether.

H. V. A.

COCAINE AND CHERRY LAUREL WATER.

C. Glücksmann (*Ph. Rundschan*, 1898, 473) opposes the statement of L. Declin, that cocaine hydrochlorate is incompatible with genuine cherry laurel water, while soluble in a water made from hydrocyanic acid, suggesting the alkaloid as a test for the spurious water. He states that the pharmacopœial cocaine salt will make a clear solution (even 5 per cent.) with cherry laurel water, which shows on standing, no greater change than does a distilled water solution.

H. V. A.

TOXICOLOGICAL EXAMINATIONS FOR ALKALOIDS.

The investigations of Hulsebosch, on alkaloidal assays of extracts, by means of Smetham's extraction apparatus, suggested to J. A. Mjoen (*Apoth. Zeit.*, 1898, 591) an application in toxicological work and that with much success.

The method consists in extracting the food (milk, beer, meat) or the organs (stomach contents, decayed flesh, etc.) with alcohol and tartaric acid, solution of the evaporated extraction in water, and treatment of this with ether or chloroform in the extraction apparatus in a manner similar to the extraction of fat in the Soxhlet's apparatus.

This extraction removes fat and coloring matter which drops into the flask, wherein the ether is heated. When all the fat is removed the acid solution is made alkaline and extraction continued with a new supply of ether in a new flask. The free alkaloid is now dissolved and flows into the flask in which it can be weighed. The method is applicable to most poisonous bitter principles (like picrotoxin) as well as to alkaloids. For application to morphine, chloroform must be the solvent. H. V. A.

ACONITE IN TORMENTILLA.

A fatal case of poisoning is reported (*Ph. Zeit.*, 1898, 339) from Buda Pesth, caused by administration of Tormentilla mixed with

aconite—an occurrence without excuse, since the appearance of the two drugs is markedly different. H. V. A.

A PTOMAINE RESEMBLING STRYCHNINE.

Mecke and Wimmer (*Pharm. Zeit.*, 1898, 300), in a toxicological examination of a decomposing corpse, extracted a principle which gave with picric acid, potassium bichromate and potassium sulphocyanate, the same reactions as strychnine. It differed from the latter, however, in its reactions with Froehde's Reagent (producing a dirty green color) sulphuric acid (yellow to cherry red) and Erdmann's Reagent (yellow), none of which affect strychnine. It is also scarcely bitter and, injected into a frog, produced no toxic effect. It is evidently a ptomaine, and not the one reported by Amthor (Bericht, bayerischer Vertr. angewant. Chemie, 1887), differing from this in its behavior with sulphuric acid and potassium bichromate.

H. V. A.

THE UNITED STATES PHARMACOPŒIA.

The "Proceedings of the Missouri Pharm. Assoc., for 1898," gives a report through G. H. Chas. Klie, M.D., Chairman of the Committee, of the efforts made to obtain the opinions of the medical profession concerning the revision of the next Pharmacopœia. A circular letter (which we have not room to quote) was sent out to 1,500 physicians, accompanied by a postal card which contained ten questions printed on it with sufficient blank space to answer yes or no. Of the 1,500 cards sent out, 311, or 20·6 per cent. were returned with all or more or less of the questions answered; 207 of these had signatures; 104 had none.

Question No. 1.—"The United States Pharmacopœia, is it your standard?" was answered by 300 affirmatively; 277 answering "Yes," others saying "Partly," "Yes, to a certain extent," "Yes, as far as it goes," "Yes, if I have any." One says, "No, the general and lamentable incompetency of average country druggists forces doctors to ready-made remedies." Another says: "Prefer German," etc., etc.

Question No. 2.—"Do you recommend changes?" brought a total of 153 answers; affirmative, 85; negative, 49; non-committal, 19; no answers, 158. Some say, "Yes, all latest," "In keeping with the times, yes," "Revision right up to date," "Give maximum and minimum doses, also frequency of dosage," "Let well enough alone."

Question No. 2 *a*, "Additions?"—The total number of answers was 94; affirmative, 81; negative, 131; no answers, 217. Additions suggested were, in part: "Antipyrin, phenacetin, antitoxin, acetanilid," "Alkaloids and active principles," "Tuberculin and antitoxin," "Palatable fluid extract of cascara and also palatable preparations for disguising quinine and preparations," "All new remedies that are good," "Compel all druggists to dispense from one formula," etc., etc.

Question No. 2 *b*, "Omissions?"—The total number of answers was 61; affirmative, 28; negative, 31; non-committal, 3; no answers, 250. Of the 27 affirmative answers, 6 say, "Yes," "Leave out the metric system," "Lard," "Tinctures from all except gum resins and iron," "All tinctures of which there are fluid extracts," etc., etc.

To question No. 2 *c*.—"Changes in formulæ or manipulations?" etc., total number of answers was 59; affirmative, 23; negative, 20; non-committal, 6; no answers, 252. Some say: "All should be metric;" "Make remedies more palatable;" "Use no foreign terms," etc., etc.

To question 4.—"Shall the United States Pharmacopœia give Maximum Doses?" the total number of answers, was 291; affirmative, 264; negative, 23; non-committal, 4; no answers, 20.

To question 5.—"Do you Prescribe Proprietary Remedies?" the total number of answers was 294; affirmative, 178; negative, 116; non-committal, 2; no answers, 15. Some say: "Some coal tar combination," "Those that are prepared especially for the medical profession," "Rarely, and am ashamed each time I have prescribed them," "They are only fit for lazy physicians and quacks."

Question No. 6.—"If so, Why?" 147 give their reasons for doing so; 29 give "convenience" as their reason; 33 "elegance, superiority, palatability, usefulness, discovery, placebo," etc.; 41 give as reasons: "Good results, satisfactory, eligible, necessary, supply a long-felt want," etc. Others say: "Because their appearance is less repulsive than when prepared by pharmacists," "Right manufacturing is expensive, and druggists cannot do it," etc., etc.

To question No. 9.—"Shall fermented and distilled liquors be dismissed from the United States Pharmacopœia?" 67 answer affirmatively, 220 negatively.

To question No. 10.—"Are you in favor of introducing the metric system in prescribing?" there were 301 answers; affirma-

tive, 138; negative, 163. Some say: "Yes, but not discarding the old while our people continue to think in $\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{2}$, etc., instead of $\frac{1}{5}$, $\frac{1}{10}$, $\frac{1}{100}$, etc." "Yes, if made universal," "It's more scientific," "Hundreds of physicians do not understand it, and it would cause many serious mistakes," "No!!! Be Americans, and for God's sake quit aping other nations."—*Jour. Amer. Med. Assoc.*, September 10.

The above interesting article, which is only quoted in part, should be read in its entirety. C. B. L.

PHARMACOLOGICAL NOTES.

PHYSIOLOGICAL ACTION OF APOCYNUM CANNABINUM.

According to T. S. Dabney, M.D. (*Therapeutic Gazette*, 1898, p. 737), the principal action of *Apocynum cannabinum* is upon the heart. This observation is based on a series of experiments conducted by Dr. J. Rose Bradford to ascertain the physiological action of this drug. "The heart of the dog is slowed down to two beats to one respiration, and even as low as three beats to two respirations. It will thus be seen that it is more powerful than digitalis. No such results have been obtained experimentally from the use of digitalis, for the vagus becomes paralyzed before this point is reached.

"Apocynum strengthens the heart and increases its tone, so that it stops the heart of the frog in systole. In mammals the heart is stopped in diastole, though a massive dose may stop it in systole. Clinically, it has been found to regulate in a marked manner the action of the irregular heart, but it *does not* slow the normal heart. It will be seen that it very closely resembles the action of strophanthus—itself one of the Apocynaceæ—digitalis, adonidin, caffeine and sparteine, but it is the most powerful of the group. Its action on the arteries differs from that of digitalis, as is shown by changes in the blood-pressure. It causes no contraction of the arteries, hence no increase in blood-pressure. It, therefore resembles strophanthus rather than digitalis in this respect." These statements are said to be substantially confirmed by experiments carried on by Dr. Ringer in University College Hospital, Cambridge, England; while the investigations of Dr. Solokoff, in the clinical laboratory of Prof. S. P. Botkin, St. Petersburg, are also said to have shown "slowing of heart's action, enlargement of pulse-wave and *marked rise of blood-pressure.*"

"According to experiments conducted by Petteruti and Somma (*Il Policlinico*, Nos. 10 to 14, May to July, 1894) far different results were obtained when the decoction was used instead of the tincture. The decoction seemed to act mainly on the stomach and intestines, promoting catharsis and emesis, when emeto-cathartic action was delayed, decided action on heart was noted and a resultant increased diuresis and acceleration of heart-beat. The tincture was found to be free from gastro-intestinal irritant effects, even when given in large doses."

These authors claim: "A marked effect of the tincture is the production of diuresis, which is never accompanied with albuminuria; when albumin is present, it has disappeared after a course of the tincture." This latter statement is said to confirm the same point made in Dr. Dabney's paper published in 1880. "Apocynein being soluble in boiling water and insoluble in dilute alcohol, probably accounts for the nauseating effect of the decoction. Apocynin, on the other hand, is insoluble in boiling water, but soluble in alcohol." "It will be seen, then, that the two alkaloids isolated in 1883, by Schmiedeberg, have different properties." The paper concludes with the statement "that apocynum acts as a diuretic through its cardio-kinetic action, and not by irritation of renal epithelium"—a view claimed in Dr. Dabney's original paper on this subject.

J. L. D. M.

CASTOR-OIL BEANS.

A case which was puzzling, for the reason that the cause of death was not discovered until the coroner's inquest, occurred recently in a child aged 4 years. The child was taken suddenly and violently ill, and died in a short time, the father stating his belief that some beans which the child had taken from an uprooted plant in a vacant lot had poisoned her. Upon investigation, it was found that the beans were taken from a castor-oil plant, and that they had caused an acute nephritis from their poisonous and irritating action. Several other children were made very ill, but no other casualties beyond the one mentioned have been recorded thus far.—Letter from Philadelphia to the *Medical News*, November 26th. C. B. L.

POISONING BY "HEADACHE POWDERS."

Dr. Robert W. Greenleaf (*Boston Med. and Surg. Jour.*, October 13th) records the case of a woman to whom he was called in

consultation by Dr. Coggeshall. He describes her condition as follows:

The symptom which specially attracted our attention was the extreme degree of cyanosis. This was one of a peculiar bluish tinge, most marked in the fingers and lips. Her pulse was weak, but otherwise she did not appear so ill as the degree of cyanosis would lead one to expect.

"The immediate treatment," he says, "consisted of rest and aromatic spirits of ammonia. Under these her strength gradually returned."

It appears that the patient had bought a packet of powders purporting to be a positive cure for sick and nervous headache. Analysis showed that each powder contained three grains of acetanilide and two grains of phenacetine, with a little caffeine. She had taken five of the powders during the night, and had thus ingested in all fifteen grains of acetanilide and ten grains of phenacetine.—*New York Med. Jour.*, November 5, 1898. C. B. L.

A CURIOUS CASE OF PHOSPHORUS NECROSIS

is recorded in the *Lancet*, due to the inhalation of phosphorus fumes. The patient was a man of good health, consuming about twenty cigars a day, and using many matches to each one, as he frequently interrupted the smoking during his work. It was computed that for the last twenty years he had daily inhaled the vapor given off by over 100 matches. The progress of the disease involved the loss of one of the maxillæ, and eventually death from exhaustion.—*Philad. Med. Jour.*, December 10, 1898. C. B. L.

SUPRARENAL EXTRACT.

Von Cyon states (Deutsche Med. Woch., from Pflügers Archiv für Phys., p. 370) that suprarenal extract has a highly stimulating effect on the sympathetic nervous system of the heart and the vessels (accelerants and vasomotors), while it has a paralyzing effect upon the regulator nerves of these organs, the vagus and depressor.—*Journal American Medical Association*, p. 1246. J. L. D. M.

A CASE OF SULPHONAL POISONING.

Richmond (*British Medical Journal*, October 29, 1898) reports the case of a middle-aged woman to whom 2 drams of sulphonal were administered accidentally. The patient became unconscious,

EUPHTHALMINE.

Trentler (*Klin. Monatsbl. f. Augenheilk*, September, 1897, *Archives of Ophthalmology*, xxvii, p. 106) states that euphthalmine is the hydrochloric acid salt of the mandelic acid derivative of n-methyl-vinyldiacetonal-kamine. It is a white crystalline powder, readily soluble in water. It bears the same relation to eucaine "B" that homatropine does to tropacocaine. It may be employed in 2, 5 and 10 per cent. solutions. The instillation of the solution causes but slight burning sensations. As a mydriatic, a 5 or 10 per cent. solution is about equal in effect to 1 per cent. homatropine, but it affects the accommodation less and both disappear much more quickly. It is more powerful, but slower than cocaine, and does not similarly affect the corneal epithelium. A 2 per cent. solution will give moderate mydriasis in half an hour without disturbing the accommodation which will disappear entirely in two or three hours. Thus far no unpleasant constitutional effects have been noticed.—*Boston Med. and Surg. Jour.*, November 17, 1898. J. L. D. M.

UROTROPIN, A NEW URINARY DISINFECTANT.

Wilcox (*Medical News*, November 12, 1898) writes on the use of *urotropin* as a urinary disinfectant. This substance is formed from the union of ammonia and formaldehyd, and appears in the form of colorless crystals. The drug causes alkaline urine to become acid, thereby clearing its turbidity, and has such an inhibitory effect upon the development of microörganisms that they do not grow in urine in which it has been excreted, even after artificial inoculation. Wilcox reports a number of cases, one of enlarged prostate and heart-failure, another of phosphaturia, a third of acute specific urithritis, and a fourth of cystitis with renal disease, in all of which excellent results were obtained. He concludes that, in doses of 30 grains per day, it renders alkaline urine acid, prevents the development of bacteria, and it is indicated as a disinfectant before operation on the urinary tract.—*Phil. Med. Jour.*, p. 1057. J. L. D. M.

Ehrlich's Drazo-Reaction in Urine.—Krokiewics (Wiener Klin. Woch.) has examined 1105 different cases, of which he made 16,167 tests for Ehrlich's diazo-reaction and recommends the test on account of the prognostic value in typhoid and tuberculosis.—The *Med. Age*, 1898, 572.

EDITORIAL.

GERMS AND DISINFECTION.

It is difficult to conceive in these days that some of the various classes of the animal and vegetable creation as some of the microbes, fleas and bed bugs, etc., were not intended to share the habitation of man, or at least with man, and some of the lower animals. The researches of Nuttall and Thierfelder, of the Hygienic Institute, of Berlin University, indicate however, that bacteria are not necessary to vital processes. They removed young guinea pigs from the mother by means of the Cæsarean operation, and every conceivable precaution was taken to prevent all access of bacterial life. "The young guinea pig was placed in a sterilized chamber supplied with sterilized air, and it was fed exclusively upon sterilized milk." At the end of eight days the animal was killed and cultures made in various media of the intestinal contents and excreta. No colony made its appearance and the authors "claim by these experiments to have proved conclusively that the *presence of bacteria in the alimentary canal is not* essential to vital processes, at any rate in the case of guinea pigs;" and they consider that other animals, as also human beings, could exist in the absence of bacterial life so long as the food supplied is purely animal in character. They further experimented in adding vegetable food to the diet and found that here also bacterial life is apparently not essential for carrying on digestive processes.

Our observations in nature would likewise indicate that fleas and bed bugs lived originally like "sand flies" and "jiggers" among the wild plants. They have found, however, that, like the ubiquitous tramp in some sections, that man or his dwelling places may be utilized as a "stopping place" to rest and be refreshed until told to move on. Civilization, it would then seem, is responsible for providing places of abode for these different objects of nature which would have been content possibly—like the negro—to remain in their original home. We find about us everywhere germs and insects and other organisms feeding upon our garden crops, house plants, furniture, food and even ourselves. They invite themselves and feel that they are, or ought to be, welcome and make us uncomfortable or drive us away from our abode just as our forefathers drove the American Indian from his lands (his by reason of the law of priority) in order to live and prosper.

All nature is one great family. All, like the tramp, will sleep in the king's bedchamber, and partake of his wines if opportunity presents, but woe unto him if he is caught napping. Those in possession may keep the invaders out. The weak inevitably succumb to the strong. There is a survival of the fittest, *i. e.*, the most intelligent, cunning and powerful. Those that are of the greatest benefit to the greatest number of those that survive are permitted themselves to survive. The hornets' nests are burned; the bee hives are preserved. The wolves and wildcats are destroyed and the cats and dogs are domesticated and serve us. We say the former are injurious to us, and that the latter are serviceable to us. And so it is with the germs. Some that seek possession are injurious, others may be of service and may be likened to our "pet animals," and called "pet germs." They, like the cats and dogs who keep out the destructive rats and mice from our dwellings, may serve an equally important function, though originally they frequented other fields, and by long

domestication may claim a share of our abode. We have thus intentional domestication of things we have seen, and unintentional domestication of things which we did not see until comparatively recently.

In the January issue of this JOURNAL attention was called to a novel hygienic method in the handling of bread, and also to the statement that an investigator had discovered what seemed to him to be the pathogenic agent of influenza. The trend of modern life is to discover germs and to devise ways to keep them out. We have, as a result, the movement of the individual drinking cup in the churches and elsewhere. In the household processes of sterilization are being employed in preparing food, and our babies are treated almost like the young pigs of Nuttall and Thierfelder, and still they die. The reason for this is, as was shown in a recent issue of this JOURNAL, that the heat of summer is an important factor in the disturbances of children at that time. In our mad search for discovering germs and harnessing them, we are forgetting that there are other factors that play an important part, viz.: climate, constitution, etc., and that inasmuch as we cannot get two organisms just alike we do not know what influence these various other factors play. We discourse and think seriously on the subject of microbes and sterilization, and like Pasteur find that we are unconsciously (by reason of our very absorption in the topic) drinking the very liquid in which we have washed the cherries we are eating.

It must be admitted that the modern precautions against germs are doubtless of some benefit, but we fear that the very avenues which need protection to the greatest extent, as the sterilization of money, and of books, and of barber shops, and of so many of the most important and common media for the circulation and distribution of disease are totally neglected, for practical reasons. We see no reason why the Board of Health should not indicate how bank-bills and coins should be sterilized by every one just as much as the water which he drinks—save that it is not practicable, apparently. We might sterilize all day and die from exhaustion in a very short time, judging from the experience of Nuttall and Thierfelder, who in the course of but eight days' investigations with young guinea pigs were so exhausted that they killed the animals and concluded their experiments. Professor von Pettenkoper has well said: "Human intercourse can never be made germ-tight."

It is those who understand least of the nature of germs and disinfectants that are most deluded by the subject. It is said that not long ago "a gang of coalies at Hull refused to discharge a cargo of coals until they had been disinfected." While Dr. Koch, when he "made his first visit to the Hamburg hospitals found everything prepared in the most correct style, *usque ad unguem*, and on his finishing with the first ward was invited in the usual manner to wash his hands with the most scientific soaps, disinfectants, etc. He declined, observing nonchalantly, 'There will be plenty of time for that presently.'"

Scientists know very little about these germs and their life history. Some knowledge has been gained and some advances are being made in the manner of carrying on disinfecting and treating disease supposed to be due either to the germs or the products that they produce. How little we know is well shown in the immense amount of work that has been done on the cholera and typhoid germ? So that it has come to pass that we have practically two classes of persons who view the subject of germs and disinfectants differently. One recognizes in the germ a cell, an organism, which, when destructive to a being,

is at war with the latter, and regards the matter from a material standpoint, and says if the germ cells overcome the cells of the organism the latter will succumb. I will, therefore, strengthen my cells. I will drink and eat and live so that my cells shall be healthful, and in the fight going on (consciously or unconsciously) will be the victor. The other says: "All the actions of daily life, our down-sitting and uprising, our clothes, our dwellings, the newspapers, the train, the cab, the theatre, our every bite and sup, our work and our play, all are fraught with the most hideous perils, our doom has been spoken, and only one thing can save us, and that is to jump into a bath of carbolic acid and stop there. For deadly germs lie in ambush on every hand, and we all know that they yield to no power but that of disinfectants." The truth lies between the two extremes; a healthful organism is less likely to suffer from the attacks of germs, but a sick or debilitated organism is much assisted in the warfare by not only a strengthening diet, but by the proper use of disinfectants. It must also be borne in mind that many factors influence disease, and that the strength and tone of the organism at the time of attack and the use of disinfectants are but two of these.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

A TEXT-BOOK OF VOLUMETRIC ANALYSIS. By Henry W. Schimpf, Ph.G., M.D. New York: John Wiley & Sons. 1898. Pp. 522.

The present volume is the third edition of this book; the first edition appeared in 1894. The work is designed for the use of pharmacists, and, especially, as a text-book for students in pharmacy; for this reason, it has special reference to the volumetric processes of the pharmacopœia of the United States.

Some parts of the book have been revised, but the author has not remedied the many minor defects which we consider to be the shortcomings of the book. This edition, like its predecessors, contains a useless list of so-called approximate atomic weights, the members of which compare very irregularly with those of the list of Meyer and Seubert, given on the same page (xxviii). As in the two preceding editions, the author still extends the decimal fractions derived from his approximate molecular weights, only to the third or fourth place, when stating the factors for 1 c.c. of normal volumetric solutions; while in the case of the factors for decinormal volumetric solutions, he employs the numbers derived from the exact atomic weights of Meyer and Seubert, as adopted by the U.S.P., and extends the fractions sufficiently to include all of the figures in the numbers representing the atomic weights. The present edition, like the first and second, bears a blemish which was borrowed from the U.S.P.; this is the sanction of the author to use the "rounded off" weights of materials which the pharmacopœia of this country directs to be used in preparing volumetric solutions "when a delicate balance and exact weights are not at hand." Since these quantities are invariably greater than those needed, the absurdity of bettering the matter by "rounding off" the numbers on an inaccurate balance is very evident. There is at least one good reason, and it contains a commercial idea, why a book of this kind should be free from such inconsistencies as those referred to; it is this—a teacher does not relish the necessity of repeatedly explaining these incongruities to each individual student as the latter encoun-

ters them from time to time in his laboratory work, and, for that reason, he will endeavor to have his students avoid the use of a book containing them.

Barring what we believe to be the shortcomings of the book, we consider it admirably adapted as a text-book for the student of volumetric analysis, for it treats of this branch in such a manner that the intelligent reader can easily comprehend and follow the subject.

Much new matter that will increase the usefulness of the book to the pharmacist has been added. The author has retained in the book some matters which are not dealt with by volumetric methods. Several new cuts have been introduced; the workmanship on some of them does not reflect credit upon the present state of the art. We note a typographical error on page 239, where the word sulphuric is incorrectly spelled. JOSIAH C. PEACOCK.

FORMULAIRE HYPODERMIQUE ET OPOTHÉRAPIQUE. Injections sous-cutanées d'Huiles medicamenteuses d'Essences, de substance mintrales, d'Alcaloïdes de Sues amimaux, de glandes, d'organes et de muscles, par E. Boisson et J. Mousmer. 1 vol. in 18 de 261 pages, avec 21, figures interealées dans le texte. Paris: J. B. Bailliere et Fils. 1899. 3 fr.

This little volume consists of four parts: (1) Technique Hypodermique; (2) Formulaire Hypodermique; (3) Memorial Hypodermique; (4) Formulaire Opothérapique. The technique in preparing solutions for hypodermic use and the different instruments on the market for their use are well described and illustrated. The formulæ given represent a collaboration from well known sources besides that from the authors' own experience. On animal extracts the authors present the historical side as well as the *modus operandi* in preparation. The work is very timely and will be of great value to both physician and pharmacist. Its low price and its extreme usefulness will doubtless give it a large sale.

A POCKET MEDICAL DICTIONARY. By George M. Gould. A new edition. Philadelphia: P. Blakiston's Son & Co.

This new edition of Gould's Pocket Medical Dictionary gives the pronunciation and definition of the principal words used in medicine and the collateral sciences. The supplement contains a table on "Clinical Eponymic Terms," and is a novelty which the physician will appreciate. The definitions are concise, and the style and size of the book are such that it will prove invaluable to medical students and physicians for hurried reference.

MODERN SYNTHETICAL MEDICINAL PRODUCTS. By V. Coblentz. Reprint from *Jour. Soc. of Chem. Ind.*, August 31, 1898.

One of the most interesting fields of investigation, and one which has been opened but a comparatively few years, is the preparation and application of modern synthetics.

When O. Fischer, in 1822, discovered Kairin, it was demonstrated not only that nature's products might be imitated, but that by the removal or addition of certain groups or radicals, products would be formed which would be free from objectionable qualities. Thus cocaine, while possessing in itself irritating and toxic properties, is now replaced by Eucaine "B," in which the undesirable features have been practically eliminated.

The method of classification adopted "consists in arranging the bodies into general groups according to medicinal action; as, for example, antipyrites,

antiseptics, hypnotics, etc. Under these groups the compounds are arranged into these various chemical classes. The object of this has been to give prominence to the presence of certain groupings which occur in each of these classes, and to the influence exerted by the introduction of new groupings; in other words, to show, wherever possible, the relationship between chemical constitution and physiological action." The author has come to be regarded an authority on the subject of modern synthetics, and the paper is one full of information and value.

THE PHYSICIAN'S VISITING LIST FOR 1899. Philadelphia: P. Blakiston's Son & Co.

This is the forty-eighth year of the publication of The Physician's Visiting List. It is primarily intended as an account book for keeping notes on engagements, addresses, etc. There is also contained a brief article on the Metric System, by Professor Oldberg; dose table; comparison of thermometers, and other useful information. The work is well arranged; the paper and finish of the best, and, because of its usefulness to the physician, well deserves to be nearing its fiftieth anniversary of publication.

PROCEEDINGS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION at the forty-sixth annual meeting, held at Baltimore, Md., August, 1898. Also the Constitution, By-Laws and Roll of Members. Baltimore: 1898.

Volume 46 of the Proceedings of the American Pharmaceutical Association comes to us at the beginning of the new year with considerable gratification. The Secretary and Reporter on Progress of Pharmacy are to be congratulated that they have expedited the publication of this work so that in four months after the meeting the results are in the hands of its members. This alone enhances the usefulness of the work considerably, as there are so many things contained in the proceedings that the investigator desires readily to see, and it is this volume that he places considerable reliance on and obtains time-saving assistance. The proceedings of the Association have already been referred to in this JOURNAL. We note a mistake on p. 240, in that some remarks made by Mr. Edwin M. Boring, of Philadelphia, are accredited to Prof. F. X. Moerk. It is safe to say that every pharmacist, with the interest of his profession and business at heart, requires a copy of this storehouse of information, and ought, by membership in the organization, contribute his support and sympathy. It is very evident that the leaders and pioneers in American pharmacy are devoting their best energies during all the year for these annual meetings, and from which emanates the light which shows the progress of events and whither we are drifting. The year 1898 is shown by the proceedings to be as encouraging to the American pharmacist as Dun & Co.'s or Bradstreet's report indicate the year has been throughout the business world in America.

AMERICAN PHARMACEUTICAL ASSOCIATION.

To the Druggists of the United States and Canada.

In the daily life of the druggist many questions arise of a practical nature which might be answered by a series of experiments, but which for lack of time, of suitable apparatus, or of other facilities, remain unsolved. Such are trouble-

some or unsatisfactory formulas, difficult or unsightly prescriptions, questions of the relation of quality to cost of drugs or chemicals, lengthy or complicated processes which might be simplified, and problems concerning all phases of practical pharmacy.

The colleges of pharmacy of the United States and Canada are in a position to work out many of these problems without cost to the druggist, and would doubtless be glad to show their interest in practical matters by undertaking such investigations and presenting their results in papers at the next meeting of the American Pharmaceutical Association.

The Association is in sympathy with the druggists in these matters, and will undertake to find investigators for such questions as may be submitted. To this end all druggists, whether members of the Association or not, are invited to send questions or descriptions of difficulties concerning any branch of practical pharmacy, improvements desired in specified formulas (wherein a difficulty is described), etc., as early as possible.

Inasmuch as the colleges close in the early spring, and time is required for investigation, an early attention to this invitation is desired. No questions should be submitted later than May 1, 1899. While the committee cannot agree to solve all problems and must reserve the right to reject such as are not of general interest, yet with your prompt co-operation in stating what you, as a practical druggist, are specially interested in, we hope to make this of personal as well as of general value.

Address all communications to

WILBUR L. SCOVILLE,
Mass. College of Pharmacy, Boston, Mass.

On behalf of the Scientific Committee A. Ph. A.

NATIONAL PURE FOOD AND DRUG CONGRESS.

The second annual meeting of the National Pure Food and Drug Congress was held in Washington from January 18 to January 21, 1899. The first Congress met in March of last year and adopted a bill which provided for the organization in the chemical division of the Department of Agriculture of a food, beverage and drug section, under the direction of the chief chemist, to undertake the analysis of foods, beverages, condiments or drugs offered for sale in the States, District of Columbia and Territories of the United States, provided the same be in original or unbroken packages. Also for the prohibition, under certain penalties, of the sale within such limits of adulterated or misbranded articles, for their seizure, condemnation and sale where discovered in transit, and for the purchase and examination of commercial samples of such articles at the discretion of the Secretary of Agriculture; also, for the enforcement of the law by District Attorneys. It defined what shall be regarded as an adulteration or misbranding within the meaning of the act; how compounded food preparations shall be branded, and how samples shall be acquired for analysis, and, finally, provided that the Secretary of Agriculture shall call upon the association of official agricultural chemists and such physicians, not less than five, as the President of the United States shall select from the medical department of the army and navy and the United States Marine Hospital, and five chemists to be selected by the American Chemical

Society, to determine jointly the standard of all food products (within the meaning of the act), such standards to guide the chemists of the Department of Agriculture in the performance of the duties imposed on them by the act, and to remain the standards before all courts. The officials appointed to determine the standards must confer with and consult the duly accredited representatives of all industries for which standards are to be established. In this shape it was given to both the House and the Senate, and but for the war following close upon its presentation would undoubtedly have been pressed to a speedy issue.

When that Congress adjourned it was as a permanent organization, first to secure the legislation desired, next to prevent undesirable amendments.

At the meeting on January 18th there were present delegates appointed by the Governors of thirty-four States and Territories, representatives of six departments of the National Government and delegates from both National and State organizations.

Commissioner J. A. Wight, of the District, opened the meeting with an address of welcome. Frank Hume, representing the local Food and Drug Association, followed with the history of the movement which had culminated in the Congress.

The President, J. E. Blackburn, Ohio, in his address, said the question of what shall we eat began with Eve in the Garden, and "what a myriad of evils would have been avoided had not the first of all pure food laws been violated."

Secretary of Agriculture Wilson and his assistant, Mr. Brigham, spoke in unqualified approval of the bill and the urgent need for the passage of it.

Dr. William Frear, in his report of the Executive Committee, showed the work done during the interim and the status of legislation.

The pharmacists were called together by Mr. M. N. Kline, and organized with Henry M. Whitney, Massachusetts, Chairman, and E. A. Cornell, Williamsport, Pa., Secretary; Mr. Kline, with Dr. F. A. Stewart and Dr. Eccles, of New York, were named as a Committee on Legislation for Trademarks.

On January 19th, Hon. Marriott Brosius, of Pennsylvania, patron of Bill in the House of Representatives, made an important address, in which he spoke of the relation of people to legislation, and he put it upon the people, and not the lack of backbone of the Congressmen that the Pure Food Bill was still in the hands of the committees.

The legislators are here, he said, to do the will of the people they represent, and if the people are inert, are sunk in the slough of apathy, and have not commanded their servants, the responsibility rests with themselves.

The report of the Treasurer, Mr. R. N. Harper, of Washington, D. C., showed $1,109 expended and $135 balance on hand.

The report of the Corresponding Secretary, A. J. Wedderburn, of Dunn Loring, Va., recited the efforts made for the bill and the Congress.

In the afternoon Dr. H. W. Wiley made an able address on "The Ethics of Pure Food."

The report of the Committee upon a method for securing uniformity in State pure food legislation, in trademarks and in chemists' analyses was rendered in part by Prof. J. H. Beal, Ohio, who urged the necessity of a national law as a guide in making State laws, and by Dr. Frear, who gave an outline of the

work done by the Society of Official Agricultural Chemists, and recommended the adoption of their standards.

E. T. Abbott, of Missouri, Chairman of the Committee on Credentials, submitted his report, after which the following committees were announced by President Blackburn :

Committee on Rules and Order of Business.—Edward Graves, T. R. Smith, S. A. Clark, C. Schnepp, D. W. Coons, M. E. Church, Dr. William Watters, R. E. Boschert, H. P. Gilpin, Thomas F. McCormick, F. S. Langton, G. B. Brockett, A. W. Blair, James M. King, John O. Nicholson, F. J. S. Robinson, J. S. Haines, H. M. Britteny, U. O. B. Wingate, C. A. Catlin, George A. Newman, Frank Benton, M. N. Kline, W. G. Thomas, W. J. Reed.

Committee on Resolutions.—Dr. H. W. Wiley, C. C. Higgins, H. A. Clark, T. N. Banks, D. W. Coons, M. E. Church, Dr. William Watters, Thomas J. Keenan, A. J. Corning, P. H. Hansen, George A. Sherer, J. T. Kennedy, Dr. Parker, James M. King, John C. Nicholson, F. J. S. Robinson, J. T. Cox, W. M. Lowney, S. H. Meadows, Charles A. Catlin, George A. Newman, Frank Benton, W. J. Reed, W. G. Thomas.

Committee on Organization.—Frank Hume, F. W. Herbst, H. B. Gilfry, W. B. McMechen, E. A. Abbott, H. L. Salsbury, Dr. William Watters, R. G. Eccles, Charles E. Dohme, P. H. Hansen, George C. Rew, Col. G. B. Brockett, Dr. A. Q. Holladay, James M. King, John C. Nicholson, F. J. S. Robinson, F. N. Barrett, G. M. Whitaker, A. H. Meadows, N. D. Arnold, George A. Newman, Frank Benton, W. J. Reed, M. N. Kline, W. G. Thomas.

At the evening session Hon. D. N. Perky, of Massachusetts, made a remarkably able argument on the subject, "Naturally Organized Food Makes Possible Natural Conditions."

At the morning session, on January 20th Prof. H. W. Wiley, of the Agricultural Department, presented the report of the Committee on Resolutions, which was interrupted to allow for Senator Mason's address, and resumed when the latter had finished.

The Committee on Organization then reported. It recommended the formation of a permanent society, having a written constitution and by-laws, with a list of officers corresponding to those heretofore existing. Amendments were offered to include a number of hitherto unrepresented bodies, and a proposition was made that the National Government should be represented by a Vice-President. Prof. H. W. Wiley was chosen for this office, the report as a whole being adopted.

Professor Hamilton, of Pennsylvania, read the report of the Sub-committee on a Uniform System of Marking for Drugs and Food Products Affected by Legislation, and the report was adopted. The hope was expressed that with a uniform system of marking, goods thus branded could be sent to any part of the country or abroad without further inspection.

The following officers were chosen for the ensuing year.

Joseph E. Blackburn, President, Columbus, O.; Frank Hume, First Vice-President, Washington, D. C.; Alexander J. Wedderburn, Corresponding Secretary, Washington, D. C.; Franklin Dye, Recording Secretary, Trenton, N. J.; R. N. Harper, Treasurer, Washington, D. C.

Executive Committee.—Dr. William Frear, State College, Pennsylvania; W. S. Thompson, Washington, D. C.; L. M. Frailey, Camden, N. J.; F. J. H.

Kracke, New York; W. A. Withers, Raleigh, N. C. President, First Vice-President and Secretaries are *ex-officio* members.

Chairmen of Committees.—Dr. William Frear, Executive, State College, Pennsylvania; D. N. Perky, Finance, Massachusetts; Dr. H. W. Wiley, Legislative, Washington, D. C.; J. H. Beal, State Legislation, Scio, O.; Frank Hume, Advisory, Washington, D. C.

Advisory Committee.—Frank Hume, Chairman, Washington, D. C.; Matthew Trimble, First Vice Chairman, Washington, D. C.; Dr. William C. Woodward, Second Vice Chairman, Washington, D. C.; Robert N. Harper, Treasurer, Washington, D. C.; J. D. Hird, Washington, D. C.; Beriah Wilkins, Washington, D. C.; J. F. Oyster, Washington, D. C.; Alexander J. Wedderburn, Washington, D. C.

In summing up the important features of this second Congress, it may be said that as large a number of delegates from the various States and Territories and various organizations were present as a year ago. Thirteen different resolutions were offered, most of them seeking to introduce modifications to the Bill, which were referred to the Committee on Resolutions, who reported in favor of TWO modifications of the Bill ONLY.

The first that the word "producer" shall be added in the Bill wherever the words "manufacturers and dealers" occur now; also, some transposition of that part of the Bill referring to adulteration of candies. All other proposed amendments or changes in the Bill offered were rejected by the Congress. It is the impression that the Bill cannot be considered at the present session of Congress, although it is believed that there is a fair chance of its being enacted into a law at the next session. Dr. Frear, the Chairman of the Executive Committee, who is, and has been, at the head of the practical work of the organization, was re-elected, and is really deserving of a great deal of credit for the excellent work which he has done. Professor Beal, of Ohio, who was a year ago made the Chairman of the Committee on Uniform State Food Legislation, made a most excellent report, and reports were also read on the same subject by Professor Hamilton, of our own Agricultural Department, and Dr. Frear.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, January 17, 1899.

The regular monthly Pharmaceutical Meeting was held in the Museum of the College, with Charles Bullock in the chair.

The minutes of the previous meeting were allowed to stand as published.

There was an unusually good attendance, and the papers and discussions were both interesting and instructive.

F. W. Haussmann was the first speaker, and having been engaged in pharmacopœial research work, reported the results which he had obtained in experiments on "Syrup of Hydriodic Acid." The paper will be published in full in a later issue of this JOURNAL.

After a preliminary discussion of the merits of this syrup in connection with the objections which have been urged against it from time to time in various journals, Mr. Haussmann said, "syrup of hydriodic acid, prepared according to official directions, is equal to any similar preparation in the market, may be confidently recommended as such, and the material decrease in cost by self-

manufacture should induce every pharmacist to prepare his own syrup." In regard to the preparation of the syrup he said that he had no substitute to offer in preference to the official method, several improvements were, however, suggested and were embodied in an improved formula and directions relating thereto. He also proposed Volhard's method of titration for estimating the hydriodic acid present.

In discussing this paper, Prof. J. C. Peacock inquired whether the author had used any means of proving the absence of potassium iodide so as to enable him to say that all the silver nitrate had reacted with the hydriodic acid.

Mr. Haussmann replied that the amount of potassium iodide used was insufficient to produce a 1 per cent. preparation.

Mr. Kebler referred to a statement contained in the paper in regard to the action of glycerin on the hydriodic acid, when added to the syrup, with subsequent formation of allyl iodide, and said that there was evidence that analogous results occur with other alcohols.

Mr. Haussmann said that he was in doubt about the odorous principle being allyl iodide, but that on distilling syrup containing glycerin with potassium sulpho-cyanate he was convinced that the odor of the distillate was due to artificial oil of mustard (allyl-iso-sulpho-cyanate), although the quantities formed were extremely small.

In reply to a question by Professor Peacock as to whether the coloration of the syrup might be due to lead iodide, Mr. Haussmann said he did not think that such was the case, as other syrups show a coloration, an example of this being Eaton's syrup, which contains neither lead nor iodide.

Professor Peacock then asked if the author thought the color due to the caramelization of the sugar caused by action of the acid upon it. Mr. Haussmann held that opinion.

A paper on "Lithium Citrate" was presented by Lyman F. Kebler, and will be published in a subsequent issue of this JOURNAL. The paper embodied a consideration of the properties of this chemical, together with tests for impurities and a new method for estimating the percentage of pure salt. Samples obtained in various parts of the United States were examined, and not one found to be perfectly anhydrous. On account of the variability of the salt in this respect, even when marked U.S.P., the author favored the use of the hydrous salt, which is a uniform product.

The paper aroused considerable discussion, and those participating in it were Professors Peacock, Moerk and Remington, and Mr. Haussmann.

With regard to the presence of lead, Mr. Kebler said that he had found it in potassium citrate, but not in the samples of lithium citrate which he had examined; he accounted for this by the fact that a test for the presence of lead in the lithium salt is recognized by the Pharmacopœia, whereas no such provision is made in case of the potassium salt.

An abstract of a paper on a "Proximate Analysis of the Leaves of Liatris Odoratissima" was read by Charles Falkenhainer, Jr., a student of the College. The paper will appear in full in a later issue of this JOURNAL.

After considering some of the uses made of this plant, the author referred to the results of his analysis. Besides coumarin, the leaves were found to contain fatty, waxy and resinous substances, chlorophyll, sugars, mucilaginous and albuminous matters and inorganic constituents. An interesting

result was that about 50 per cent. of the air-dried material is soluble in water. The crystalline principle was subjected to ultimate analysis, and its identity with coumarin, as was pointed out by Professor Procter in 1859, proved thereby.

Dr. C. B. Lowe spoke of the distribution of this principle in the vegetable kingdom, and said that it was probably present in Tonka bean in greater amount than elsewhere. In regard to its physiological action he said that it was probably narcotic.

Others taking part in the discussion of this paper were Professor Peacock and Mr. Frederick Lewton, the latter referring to the immense trade in deer's tongue (as the plant is commonly called) in Florida, where it is sold to tobacco manufacturers for flavoring their products.

Prof. F. G. Ryan read a paper on "Analysis of Commercial Vinegar" (see page 71), which aroused considerable discussion, partly on account of its relation to the question of pure foods. Those remarking on the subject of the paper were Mr. Haussmann, the chairman, Professor Peacock and Mr. Kebler.

In reply to a query by Mr. Haussmann as to the presence of malic and tartaric acids interfering with the determination of the percentage of acetic acid in certain vinegars, Professor Ryan said that these acids were present in too small quantities to be taken into account. He said, however, that tests were made for the presence of sulphuric and some other acids.

Mr. Bullock made an interesting statement in regard to cider vinegar. He said that when cider had undergone fermentation a certain degree of acidity was attained, which on further oxidation was lost, but which as the process was continued again resumed its acidity.

"A Common Error in Recorded Results of Proximate Plant Analysis," was the subject of a communication by Lyman F. Kebler, and will be published in a later number of this JOURNAL.

The last item on the programme was an exhibition of a valuable collection of specimens recently received from the Philadelphia Museums, through the instrumentality of Mr. Howard B. French. The collection consists of nearly three hundred specimens, and attention was directed to the most interesting features by Mr. Frederick L. Lewton, Curator of the Museums.

The collection embraces the following:

Specimens of crude drugs from many parts of the world, particularly showing such as are used by the natives of Japan and China, and as are sold in the Indian bazaars; seeds and fruits yielding oils used for medicinal, culinary, illuminating, lubricating and other purposes; samples of gums and resins having a medicinal use and many of the most important varnish resins; spices and aromatics used for flavoring foods and medicines, as well as for the making of perfumes; roots, tubers, starches and other food materials and series of raw sugars, cacao, beans, etc.

A special vote of thanks was tendered Mr. Lewton for his interesting talk, after which Professor Remington referred to the magnitude of the work of the Museums, in various lines. Further reference was made to the influence of the Museums along commercial and scientific lines, and its connection with the Commercial Exposition next fall.

On motion the meeting adjourned.

THOS. S. WIEGAND,
Registrar.